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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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SYNGENTA BIOTECHNOLOGY, INC.
PATENT DEPARTMENT
3054 CORNWALLIS ROAD
P.O. BOX 12257
RESEARCH TRIANGLE PARK, NC 27709-2257

EXAMINER

BAUM, STUART F

ART UNIT PAPER NUMBER

1638

DATE MAILED: 11/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/602,166

Applicant(s)

AN ET AL.

Examiner

Stuart F. Baum

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 27-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 27-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/848,696.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>8/6/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 27-31 are pending.
Claims 1-26 have been canceled.
2. Claims 27-31 including SEQ ID NO:2 are examined in the present office action.

Specification

3. The disclosure is objected to because it contains an embedded hyperlink and/or other form of browser-executable code. Applicant is required to delete the embedded hyperlink and/or other form of browser-executable code. See for example page 6, line 19. See MPEP § 608.01.

New Matter

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 30 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claim recites “nucleotide 1 to nucleotide 1246 of SEQ ID NO:2”. Applicants fail to point to support for the phrase in the instant specification. Upon a cursory search of the specification, support could not be found. Applicants are required to point to support for

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“nucleotide 1 to nucleotide 1246 of SEQ ID NO:2” or to amend the claims to delete the NEW MATTER.

Enablement

5. Claims 27-31 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claimed invention is not supported by an enabling disclosure taking into account the *Wands* factors. *In re Wands*, 858/F.2d 731, 8 USPQ2d 1400 (Fed. Cir. 1988). *In re Wands* lists a number of factors for determining whether or not undue experimentation would be required by one skilled in the art to make and/or use the invention. These factors are: the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples of the invention, the nature of the invention, the state of the prior art, the relative skill of those in the art, the predictability or unpredictability of the art, and the breadth of the claim.

The claims are drawn to a DNA molecule comprising SEQ ID NO:2 operably linked to a heterologous coding sequence, wherein said heterologous coding sequence is expressed specifically in a tapetum, an endothecium, and connective tissue of an anther but not in a microspore or pollen, or wherein expression starts at a tetrad stage and reaches a maximum level at a vacuolated pollen stage, or a DNA molecule comprising nucleotide 1 to nucleotide 1246 of SEQ ID NO:2 operably linked to a heterologous coding sequence or a DNA molecule

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comprising nucleotide 1 to nucleotide 1196 of SEQ ID NO:2 operably linked to a heterologous coding sequence.

Applicants isolated their invention by first making a cDNA library from *Oryza sativa* L. Nakdong anthers and leaves and isolating clones that are expressed in anthers but not in leaves. A clone was isolated and designated RA8 (page 13, Example 1, Step 1). A genomic clone is isolated using the RA8 cDNA clone as a probe (page 15, Step 3). Using PCR primers SEQ ID NO:8 and 9 and the isolated genomic clone, Applicants amplified a 2.7 kb fragment comprising the 5' flanking region, exon 1, intron 1, and part of exon 2 of the RA8 gene (page 16, paragraphs 5-6). A construct was produced using said fragment operably linked to a beta-glucuronidase coding sequence. Said construct was transformed into rice (page 17, Example 3). Applicants disclose that GUS spatial expression is restricted to the tapetum, connective and endothecium tissues and temporally, GUS expression is first detectable at the time when microspores are released from tetrads. The highest amount of GUS activity is observed in anthers at the vacuolated pollen stage and suddenly decreases in mature pollen (page 18, paragraphs 2-3). Applicants disclose that SEQ ID NO:2 comprises 1436 bp comprising 1196 bp of 5' DNA and 240 bp of DNA which comprise the first exon, first intron and part of exon 2 (page 4, "The constitution and function of the invention" and page 6, Brief Description of the sequences, SEQ ID NO:2).

Applicants have not reduced to practice their invention. Applicants disclosed that a 2.7 kb fragment comprising the 5' flanking region, exon 1, intron 1, and part of exon 2 of the RA8 gene operably linked to a beta-glucuronidase coding sequence is able to produce the recited spatial and temporal expression pattern, but Applicants are silent about the functionality of

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shorter DNA sequences, wherein the sequences do or do not comprise either comprising exon 1, intron 1, and part of exon 2 of the RA8 gene. In addition, Applicants' SEQ ID NO:2 comprises 1436 bp which include exon 1, intron 1, and part of exon 2 of the RA8 gene, but because SEQ ID NO:2 is only 1436 bp in length, it is not clear if SEQ ID NO:2 includes all the cis-acting elements that are required for the specified expression pattern because Applicants exemplified a 2.7 kb fragment and not SEQ ID NO:2, or nucleotides 1 to 1196 of SEQ ID NO:2, or nucleotides 1 to 1246 of SEQ ID NO:2. Applicants have not disclosed if SEQ ID NO:2 by itself can generate the same expression profile as the 2.7 kb fragment. Even Applicants' post filing research paper (Jeon et al., 1999, Plant Molecular Biology 39:35-44; Listed in IDS) disclose a 2.7 kb fragment and are silent about a 1436 bp, 1246 bp or a 1196 bp fragment. Even Jeon et al disclose that the first intron may be necessary for specificity of expression (page 40, left column, 1st full paragraph).

Benfey et al (1990, Science 250:959-966) teach that the 35S CaMV promoter consists of domains that individually regulate spatial expression within plants. "The combination of each of the five B subdomains with domain A results in an expression pattern that differs from that of the individual subdomains or domain A" (page 961, left column, 2nd paragraph). In other words, deleting a required domain will jeopardize the proper spatial and temporal expression pattern. In addition, Benfey et al (1989, EMBO J, 8(8):2195-2202; page 2200, left column 2nd paragraph) teach that not only are the promoter domains important for specifying proper spatial and temporal expression but that when all domains were present, the quantity of expression increased.

Not only are DNA sequences located 5' to the translation start site (ATG) necessary for proper expression, but in some instances, intronic regions have been shown to be necessary for proper gene expression. Busch et al (1999, Science 285:585-587) and Lohmann et al (2001, Cell 105 :793-803) teach *LEAFY* (*LFY*) and *WUSCHEL* (*WUS*), which have been shown to be transcription factors that together activate proper *AGAMOUS* (*AG*) expression, do so by binding to the second intron of the *AG* gene. Altering or deleting the intronic region eliminates binding of either *LFY* or *WUS*, (Busch et al page 587 left column, 2nd paragraph; Lohmann et al page 799, bottom and top of left and right columns) and changes the temporal and spatial *AG* expression pattern.

In the absence of guidance, undue trial and error experimentation would be required for one of ordinary skill in the art to screen through the multitude of non-exemplified sequences, by generating a multitude of promoter deletions, either by deleting bases from the 5' or 3' end of the promoter, or by deleting bases from within the promoter sequence, or combinations thereof, operably linking the fragments to a reporter gene, subcloning the reporter/promoter constructs into a binary vector, transforming plants, and selecting a multitude of transformed plants for each transformation event, in order to identify those, if any, that when over-expressed produce plants in which the reporter gene is expressed in the tapetum, connective and endothecium tissues and is first detectable at the time when microspores are released from tetrads, with the highest amount of GUS activity observable in anthers at the vacuolated pollen stage and then not being expressed in mature pollen.

Therefore, given the breadth of the claims; the lack of guidance and examples; the unpredictability in the art; and the state-of-the-art as discussed above, undue experimentation would be required to practice the claimed invention, and therefore the invention is not enabled.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 27-31 are rejected under 35 USC 101 because the claimed invention is directed to non-statutory subject matter.

This rejection is made because the claims as written, do not sufficiently distinguish over DNA, as it exists naturally because the claims do not particularly point out any non-naturally occurring differences between the claimed products and the naturally occurring products. In the absence of the hand of man, the naturally occurring products are considered non-statutory subject matter. *See Diamond v. Chakrabarty*, 447 U.S. 303, 206 USPQ 193 (1980). The claims should be amended to indicate the hand of the inventor, e.g., by insertion of “isolated” as taught by page 13-17. See MPEP 2105.

7. Claims 27-31 are deemed free of the prior art, given the failure of the prior art to teach or reasonably suggest a DNA molecule comprising SEQ ID NO:2 operably linked to a heterologous coding sequence, a DNA molecule comprising nucleotide 1 to nucleotide 1246 of SEQ ID NO:2

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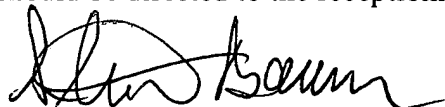
operably linked to a heterologous coding sequence, or a DNA molecule comprising nucleotide 1 to nucleotide 1196 of SEQ ID NO:2 operably linked to a heterologous coding sequence.

8. No claims are allowed.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stuart F. Baum whose telephone number is 571-272-0792. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones can be reached on 571-272-0745. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1600.

A handwritten signature in black ink, appearing to read 'Stuart F. Baum', with a stylized, cursive script.

Stuart F. Baum Ph.D.
Patent Examiner
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November 2, 2005